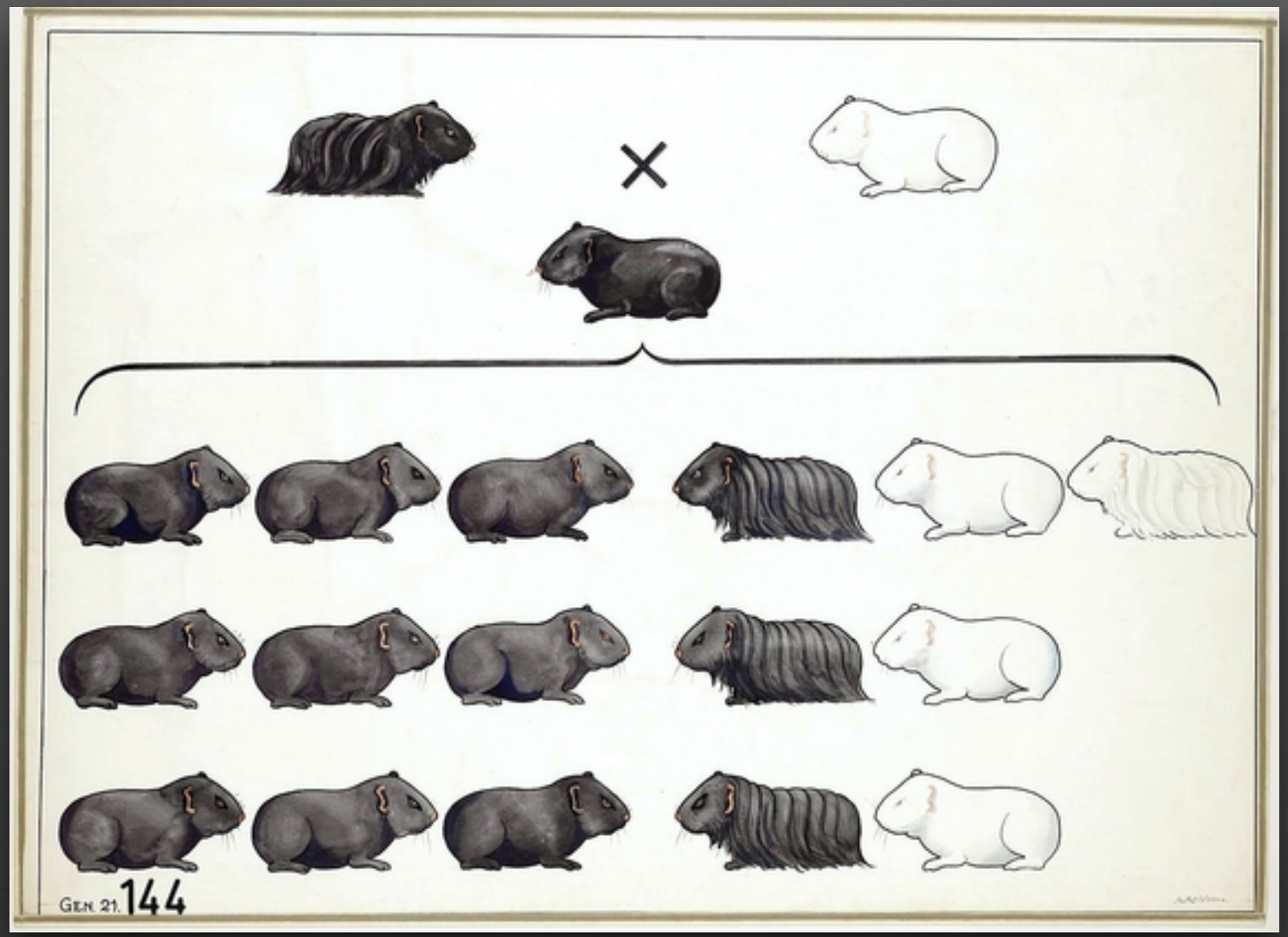
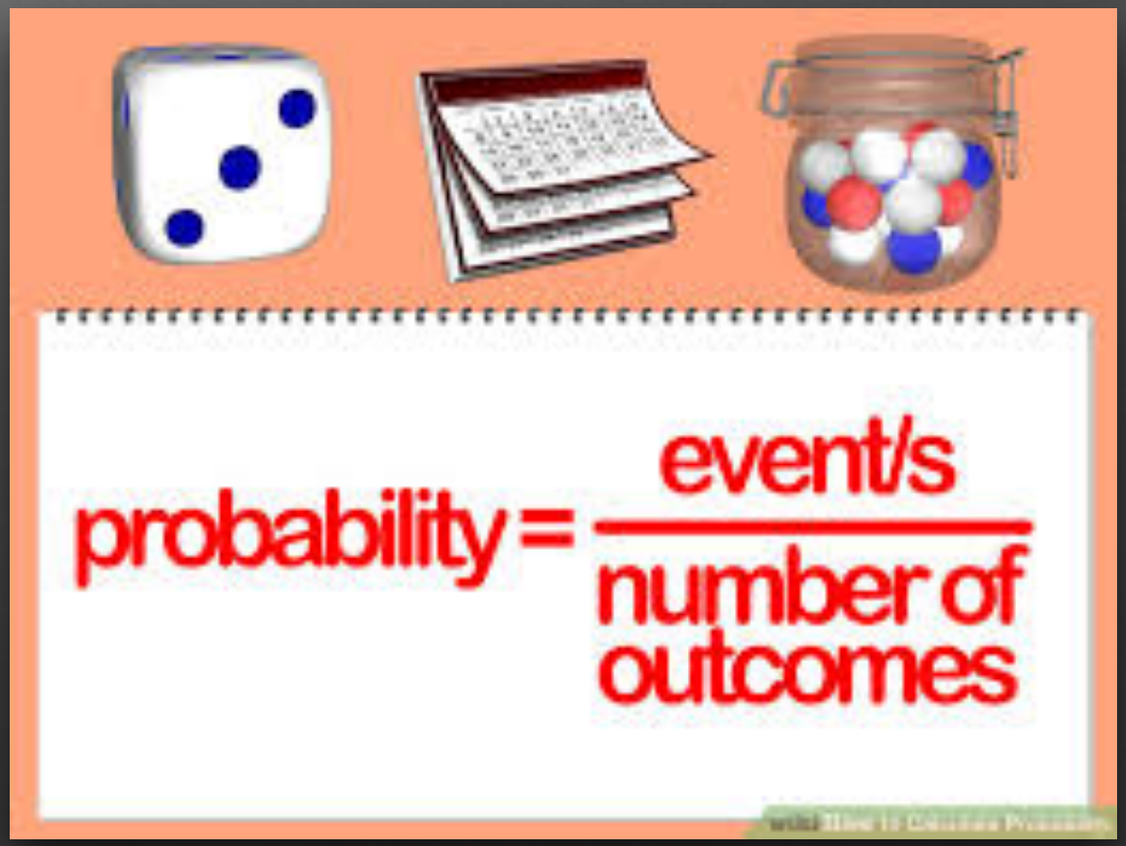


Probability & Heredity

How traits are inherited

Principles of Probability

Probability is a number that describes how likely it is that an event will occur. The principles of probability predict what is likely to occur, not what will occur.



Mathematics of Probability

For example, in a coin toss, the coin will land either heads up or tails up. Each of these two events is equally likely to happen. In other words, there is a 1 in 2 chance that a tossed coin will land heads up.

The more tosses you make, the closer your actual results will be to the results predicted by probability.

Independence of Events

When you toss a coin more than once, the results of one toss do not affect the results of the next toss. Each event occurs independently.

Because the coin landed heads up on the previous five tosses, you might think it would land heads up on the next toss. This is not the case.

The probability of the coin landing heads up is still 1 in 2. The results of the first five tosses do not affect the result of the sixth toss.

Probability & Genetics

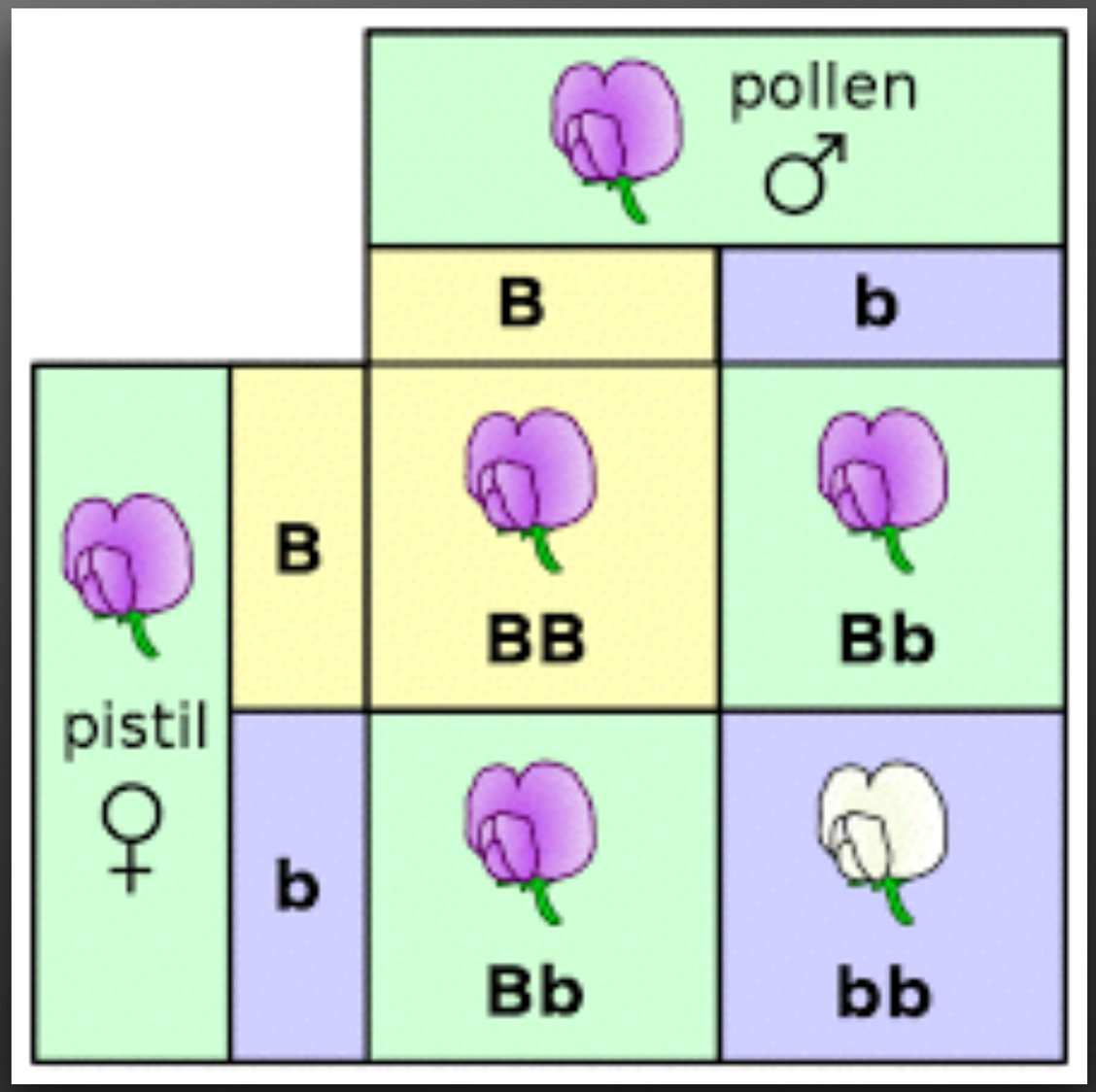
When Gregor Mendel analyzed the results of his crosses in peas, he carefully counted all the offspring. Over time, he realized that he could apply the principles of probability to his crosses.

Mendel was the first scientist to recognize that the principles of probability can be used to predict the results of genetic crosses.

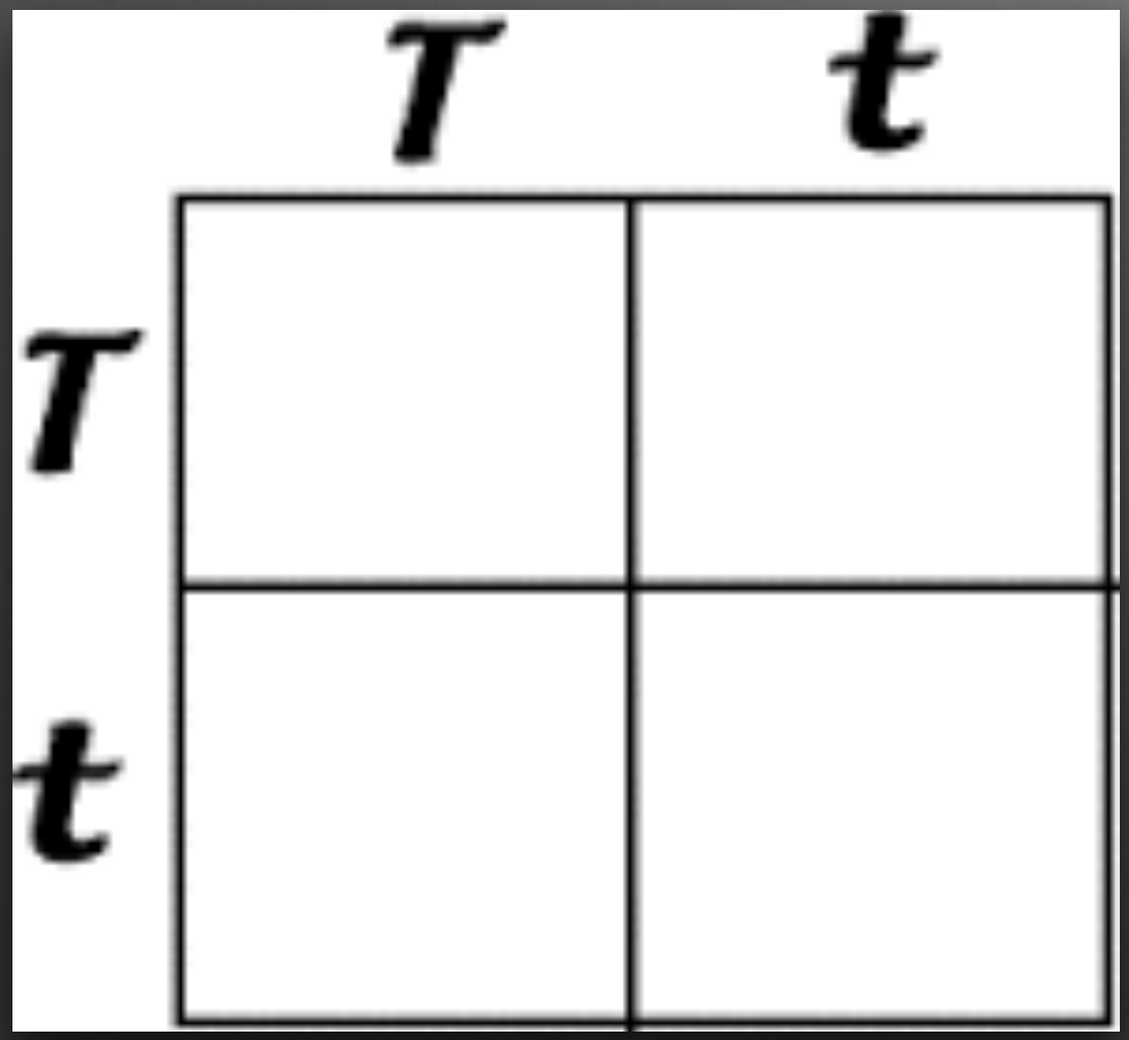
Punnett Squares

A tool that applies the laws of probability to genetics is a Punnett Square. A Punnett Square is a chart that shows all the possible combinations of alleles that can result from a genetic cross.

Geneticists use Punnett squares to show all the possible outcomes of a genetic cross and to determine the probability of a particular outcome.



Using Punnett Squares



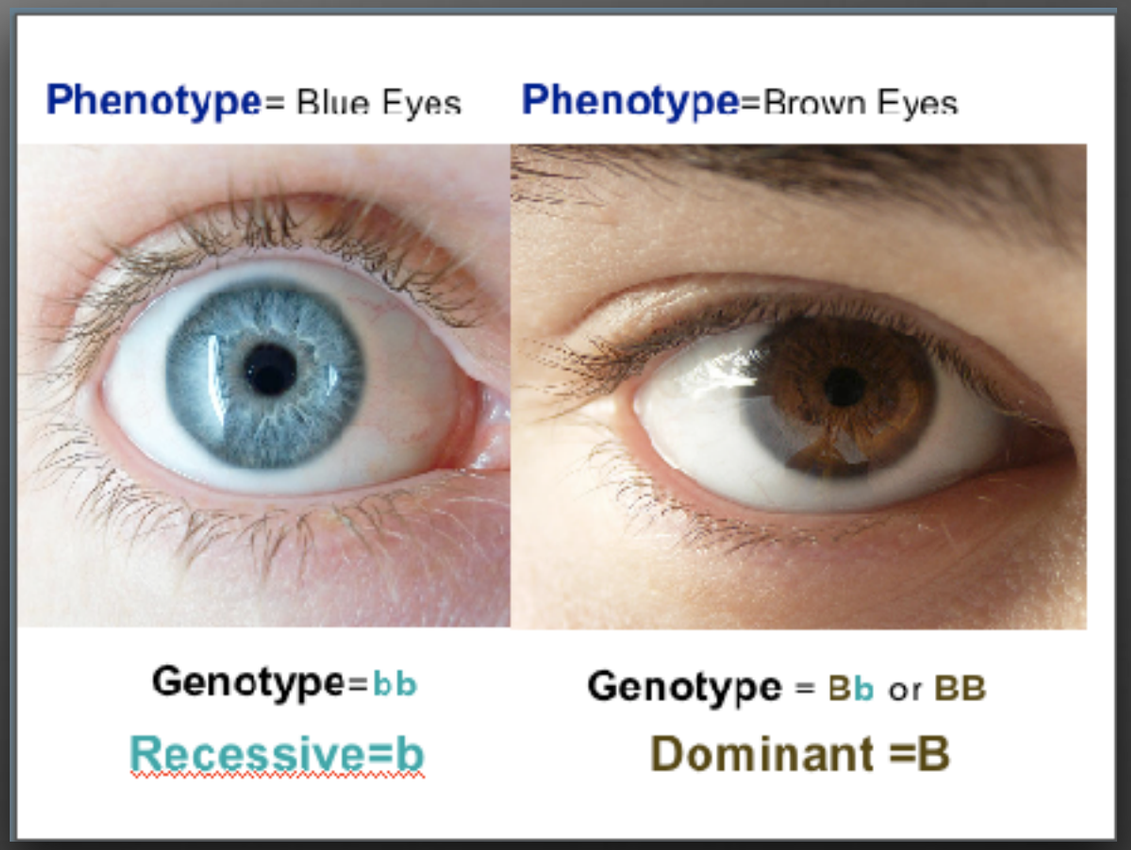
The combined alleles in the boxes of the Punnett square represent all the possible combinations in the offspring.

In a genetic cross, the allele that each parent will pass on to its offspring is based on probability. You can use a Punnett square to predict probabilities.

Phenotypes & Genotypes

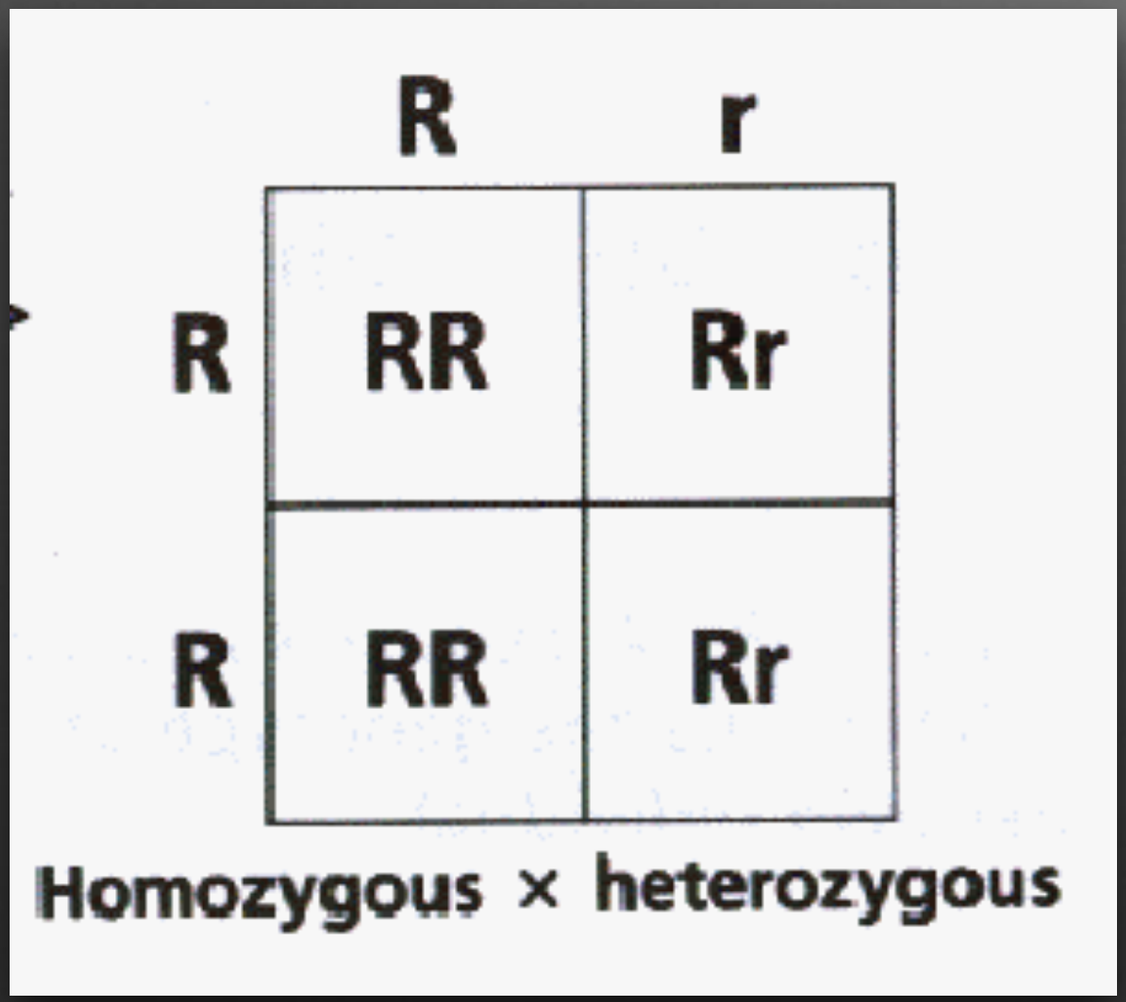
Two useful terms that geneticists use to describe organisms are genotype and phenotype.

An organism's phenotype is its physical appearance, or visible traits. An organism's genotype is it genetic makeup, or allele combination.



Genotypes	Phenotypes
AA	Yellow
Aa	Yellow
aa	Green

Heterozygous & Homozygous



Geneticists use two other terms to describe an organism's genotype.

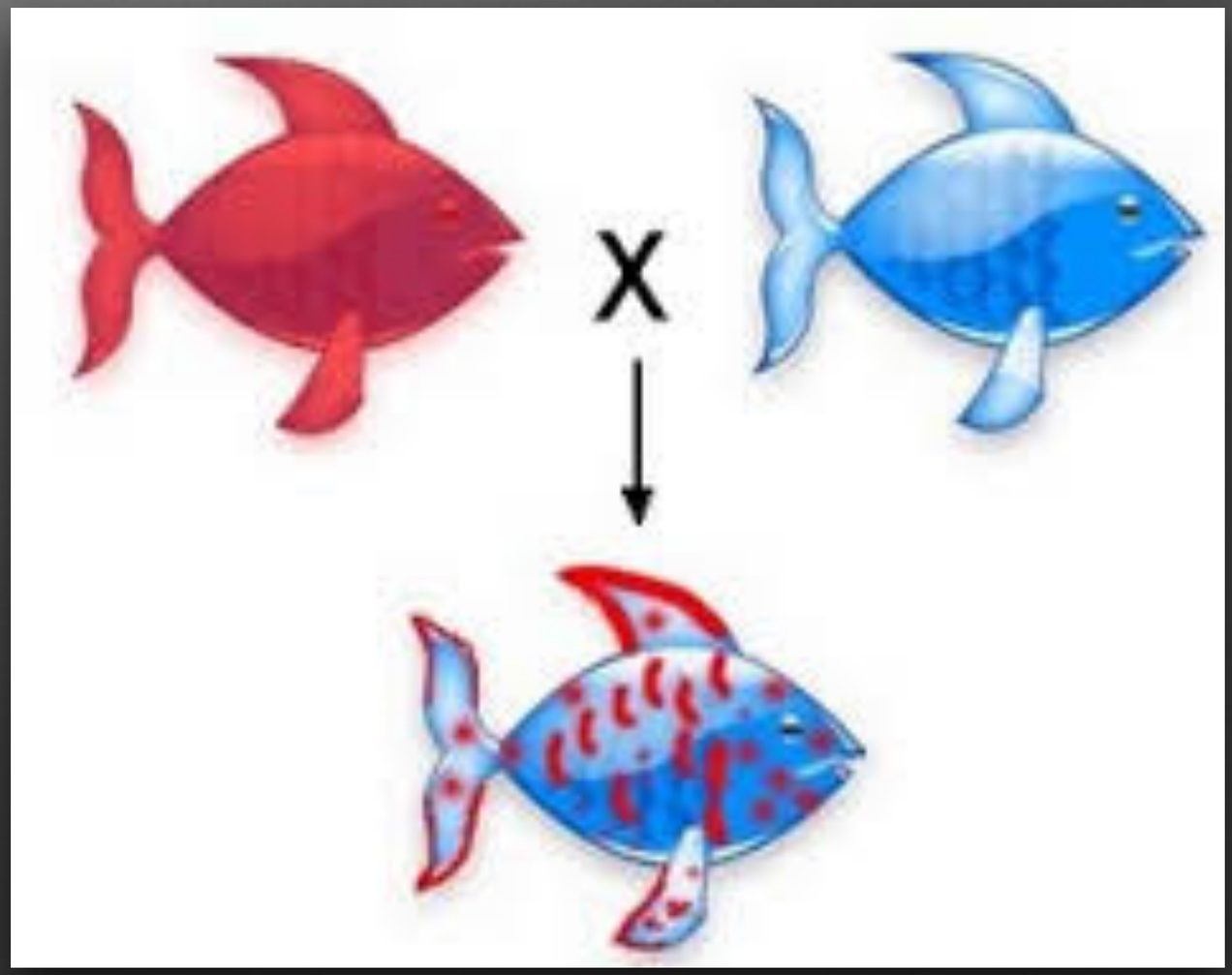
When an organism has two identical allele for a trait it is said to be homozygous.

An organism that has two different alleles for a trait is heterozygous for that trait.

Codominance

For all of the traits in peas that Mendel studied, one allele was dominant while the other was recessive. This is not always the case.

In an inheritance pattern called codominance, the alleles are neither dominant nor recessive. As a result, both alleles are expressed in the offspring.



An example of this is when a brown chicken and a white chicken have an offspring that has both brown and white colors in the feathers.

Codominant alleles are written as capital letters with superscripts to show that neither is recessive.

Keywords: English - Spanish

Probability - Probabilidad

Punnett Square - Cuadrado de Punnett

Phenotype - Fenotipo

Genotype - Genotipo

Heterozygous - Heterozigótico

Homozygous - Homocigoto

Codominance - Codominancia